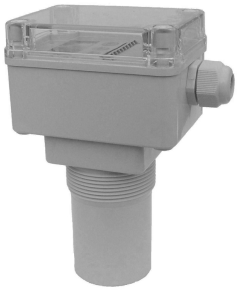
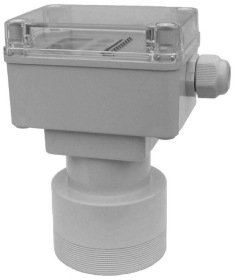


4m 6m



8m 10m

15m 20m 30m

ULTRASONIC LEVEL METER

HLT-SERIES USER MANUAL

2-WIRE STANDARD

SUMMARY

Use: Measurement for the liquid location or the material location .

Applications: It can guarantee the ultrasonic wave to traval to the occasion of measured liquid or material surface effectively. For instance: Store pot , material trough , pond , well , ditch , measuring case , granary , material storehouse ,etc..

Features:

- Integrated design, installed conveniently
- 2 wire transmitter standard, guarantee that the powerful sound wave is launched , that measurement is steady and reliable
- Protected in the excessive voltage and current , protected in the thunder and lightning
- The big show window of LCD is easy to debug and observe
- Intellectual signal treatment technology, guarantee that the instrument meets various kinds of operating occasion
- All plastic outer cover (IP67), airproof and alkali-resisting, meet the abominable environment
- Flexible support or flange are used to install

Measuring Range：

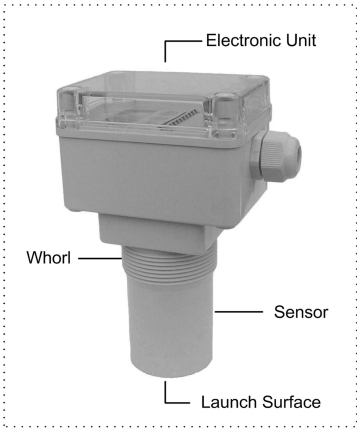
LIQUID LEVEL: 4m 6m 8m 10m 15m 20m 30m

SOLID LEVEL: 3m 5m 7m 10m 15m

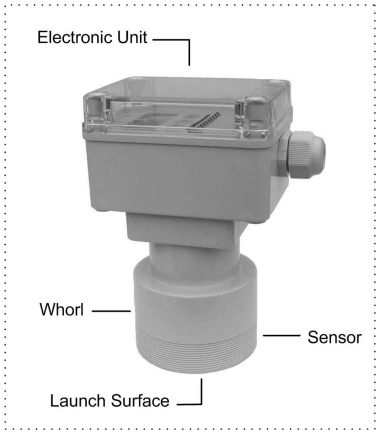
When using to measuring solid level, the most energy of ultrasonic is absorbed or scattered by solid level, so the back wave is very little,the valid measuring range of solid level is about 50% of liquid level. And the valid measuring range of solid level is determined by the installing location.

MAKE UP & THE STRUCTURE

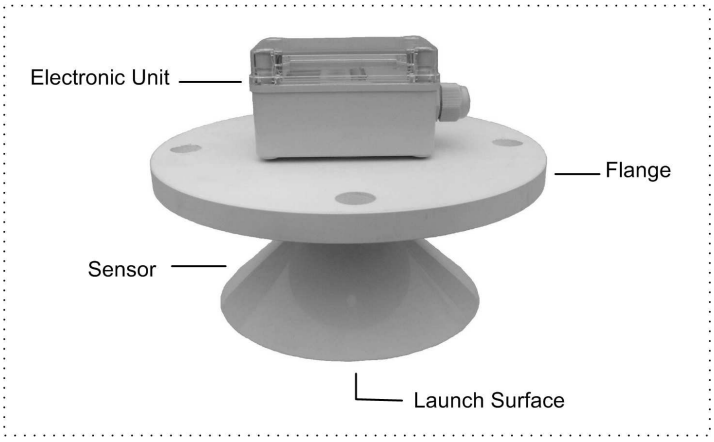
Whole Structure: There are three kinds of forms in level meter:



Model: 4m 6m 8m

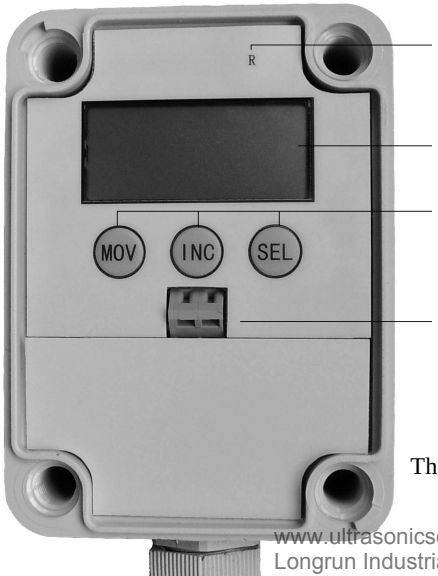


Model: 8m（A） 10m



Model: 15m 20m 30m

The Panel of The Electronic Unit：



The Restoration key

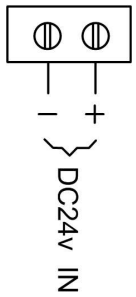
DisplayWindow

Button

Terminal

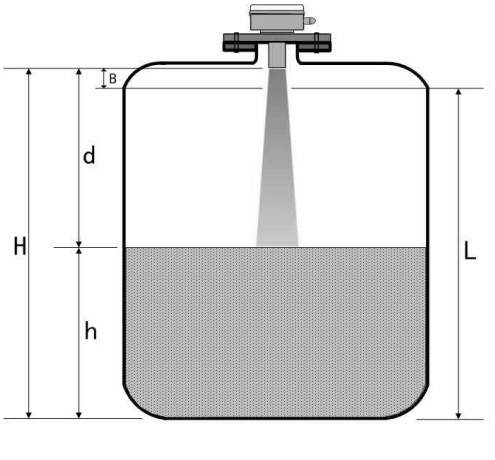
The Board of Hiding Line

Terminal Block Diagram：



TECHNOLOGICAL PRINCIPLE

The level meter is composed with the designed in the integrative ultrasonic wave sensor and electronic unit. The level meter installs on the top of the container, under the control of the electronic unit, the sensor launches a bunch of ultrasonic pulses to the things of tested. Sound wave is reflected by object surface, parts of reflected return waves echo are received and change into the electric signal. The time of launching ultrasonic wave to receiving it again is direct ratio to the distance of sensor to the things of tested. The electronic unit measures the time, and calculate out the distance examined according to the known velocity of sound. Then draw the location value of things through subtraction operation.



Symbol In The Picture:

B: Blanking Distance

d: Empty Distance

h: Thing Location

H: Installation Height

L: Measuring Range

h = H - d

The Sketch Map of Measuring The Thing location

Ultrasonic wave spread speed among gas is influenced by gas temperature, When level meter works, it measures gas temperature needing, compensates for the velocity of sound, so as to ensure the precision of measuring.

While level meter launches the ultrasonic pulse,it can't measure the return waves at the same time . So one short distance downword from sensor is **blanking distance**. If the supreme thing location examined enters the blanking distance, the instrument can't measure correctly, then error. If needing, we can count the level meter and increase to install .

TECHNOLOGICAL SPECIFICATION

Measuring Range：

Liquid	4.00m	6.00m	8.00m(A)	10.00m	15.00m	20.00m	30.00m
Solid			3.00m	4.00m	6.00m	10.00m	15.00m

Blanking Distance：

Measuring Range	4m	6m	8m(A)	10m	15m	20m	30m
Blanking distance	0.20m	0.25m	0.30m	0.40m	0.60m	0.80m	1.20m

Accuracy： 0.2% Full Span（In air）

Resolution Ratio Shown：

Measuring Range: 4m 6m 8m: **1mm**

Measuring Range: 8.00m(A) 10m 15m 20m 30m: **1cm**

Mode of Indication： 4 Digit LCD

Output Current： 4~20mA

Output Load： 0~500Ω

Output Resolution Ratio： 0.03% full span

Parameter Set Up： 3 induction buttons

Temperature Range: -40ºC~80ºC

Temperature Compensation: The whole range is automatic

Pressure Range: ±0.1MP (press definitely)

Power Supply: DC24V ±20% 30mA

Cable Diameter: Φ6~Φ12mm

Single Wire Diameter: Φ0.5~Φ1.78mm

Cable Fix： PG13.5

Beam Angle： 8º(3db) Measuring Range 4m 6m 8m

5º(3db) Measuring Range 8m(A) 10m 15m 20m 30m

Measure Cycle： 1second

Crust Material: ABS

Sensor Material： PVC

Protect Grade： IP67

Mode Installation： Flange or the support

Flange Standard of Butt Joint：

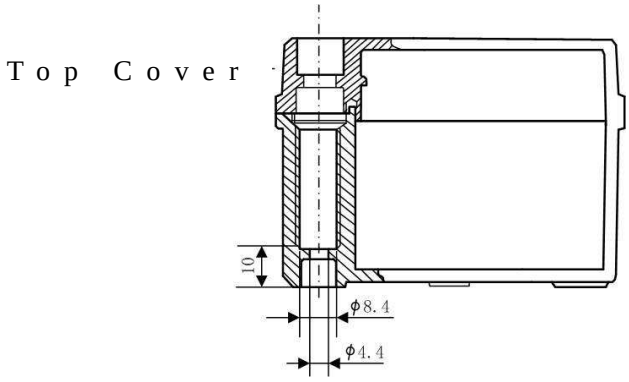
Measuring range 4m 6m 8m：Minimum DN65

Measuring range 8m(A) 10m：Minimum DN80

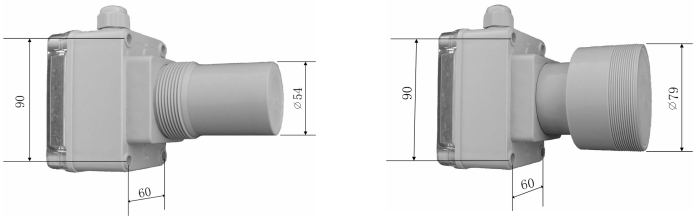
Measuring range 15m：Minimum DN150

Measuring range 15m 20m 30m：Minimum DN200

The Crossing Hole Structure of Installation With Brackets：

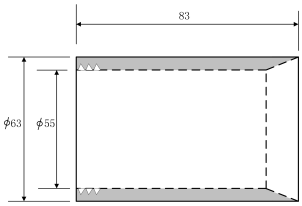


Should open the top cover while installing , then penetrate M4 regular screw or the bolt downwards.

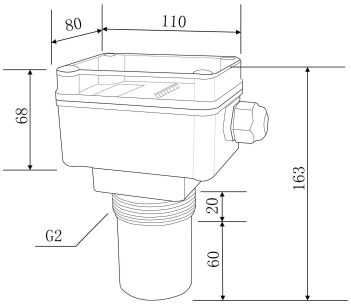


The Crossing Hole Position Of Installation With Brackets

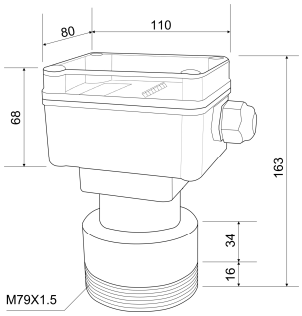
Cannula: Using for Model 4m 6m 8m ultrasonic level meter,when installing at a flange or in a tube, the cannula must be fixed on the sensor. A screw thread is in the cannula, it can fix on the sensor directly:



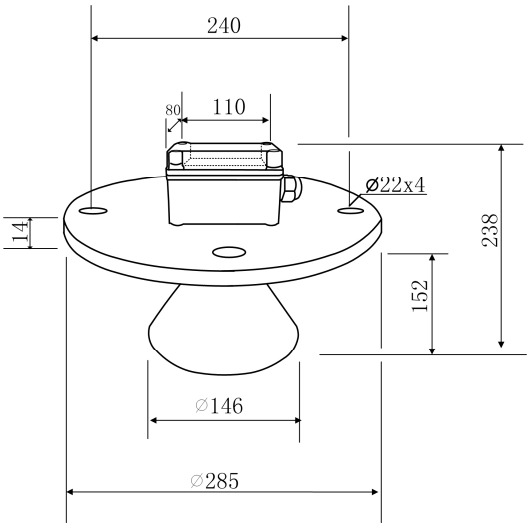
The External Dimension of Level meter：



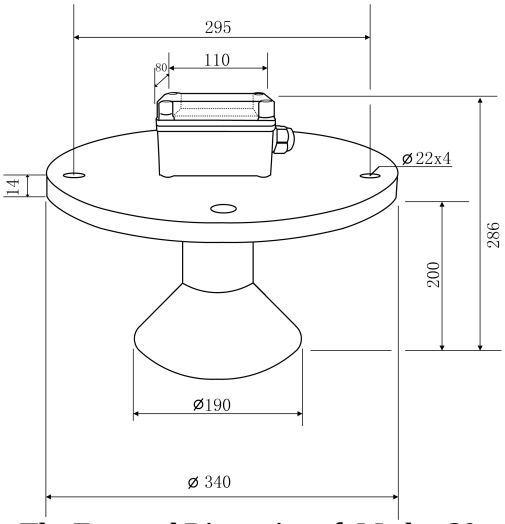
Model:4m 6m 8m



Model: 8m(A) 10m



The External Dimension of Mode : 15m



The External Dimension of Mode : 20m 30m

INSTRUMENT OF WORKING STATION AND OPRATION

Display Modes

4 digit LCD liquid crystal display

Buttons

There are 4 keys on the instrument, the function as follows:

SEL: For choosing different display content or parameter.

INC: When setting up the parameter input a certain digit figure from 0 to 9 circulation change.

MOV: Choose a certain digit while setting up the parameter. When choosing this digit, this digit becomes dark, later pressed INC key and revised its value.

R: Press this key, the instrument is restored.

Working State And Setting Up The Parameter

The instrument has two kinds of working state:

Measure state & State of setting up the parameter

Pressing SEL、MOV key at the same time can be switched around.

Measure State

Measure state, instrument can make the thing location value , empty

from value , temperature value shown by turns. Press SEL key to choose. Give a demonstration as follows: (please pay attention to marking symbols)

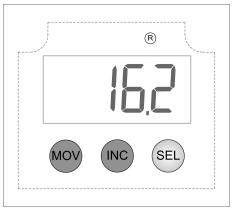
Display Mode	LCD
Thing Location Value	3.692
Empty From Value	2.586
Temperature Value	16.2

No matter what kinds of number value it will be shown, the current outputting of instrument is always the corresponding thing location value.

Display screen offside has a sign (▲)to flicker ,indicate that having echo to be admitted arriving at.他 he unit of the thing location value and the empty from value is meter(m), the unit of temperature is degrees Centigrade.

Pressing SEL and MOV keys at the same time , instrument can enter the state of the setting up parameters.

The level meter shown thing location value first after started、restored or exit of parameter setting up.



The thing location value **The empty from value** **The temperature** value

Press SEL key to choose display, make the thing location value , empty from value , temperature value shown by turns.

Leave off the key quickly after pressdown,instrument can showing by turns.

Alone press INC, MOV keys is invalidate.

Pressing SEL and MOV keys at the same time , instrument can enter the state of the setting up parameters.

State of Setting Up The Parameter

In this state, the instrument shows various kinds of parameters needing users to set up. Press SEL key to choose..The content and sign give a demonstration as follows:

Display Mode	LCD
Installation Height	6.278
Measuring Range	6.000
Inside password	00

Installation Height: The distance from launch surface of the sensor to the container bottom.

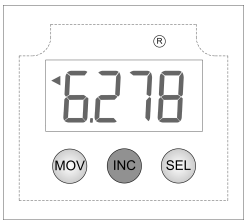
Measuring Range: The maximum of the examined thing location, output the current of 20mA correspondingly.

Inside password: After inputting correct value, the instrument enters the state of the inside working parameter setting up.Users needn't set up the numerical value, please don't enter the state of the inside working parameter setting. Should press

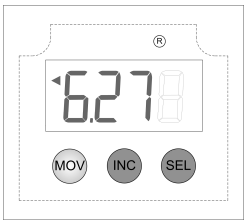
SEL key and leave this parameter. Or press SEL and MOV keys at the same time and withdraw the parameter setting.

Press SEL key and choose the parameter, press MOV and INC key to revise. Should press SEL key once again after revising, in order to enable the instrument to store this parameter.

Pushing SEL and MOV keys at the same time can withdraw from the state of the parameter setting up, and store the parameters.



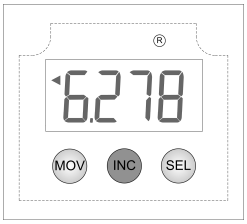
Pressing SEL and MOV keys at the same time , enter state of the setting up parameters



Press MOV choose the carry o f parameter.

Press INC,to change the value.

Press SEL key to store the previrous parameters and enter next



Pushing SEL and MOV keys at the same time withdraw from the state of the parameter setting up

Instrument checkout

Instrument can checkout aim at surface of wall. But should pay attention to it ,inorder to improv stability of measureing.in the instrument have inspect window, its collectivity extent is 1 meter (m) ,the mark out of the measuring window range,instrument needs a judgment course, So the measuring instance can't have break over 0.5m.or instrument need time about 10s to feedback.for the break from farness to near.sometimes,instrument will appear mistake. But in fact measuring it is usually beingless.

INSTRUMENT INSTALLING

The rational installation of the instrument is the key to working reliably.

The instrument install above container, launch surface of the sensor should point to the liquid surface or the material surface vertically. If it is the airtight container, should adopt the flange type to install. Other situations can install with the simple support.

Flange type installation should furnish the flange according to the instrument whorl size.

Installation Demand

When ultrasonic wave is launched, it will have a very small diffusion angle. If have other object in the diffusion angle, ultrasonic wave will reflect, some measure error will appear when the reflection strong enough. But velvet container can't reflect ultrasonic wave, send from above.

△Installation site far away from accidented container wall to try one's best, far away from the object that can

stop sound wave of container such as escalator、transfusing mouth and blender etc..

△Measuring Range 4m 、6m 、 8m as follows instance must use a Cannula utside of the sensor.

1. At the place of container flange to install.

2.Install at the thicker floor slab hatch..

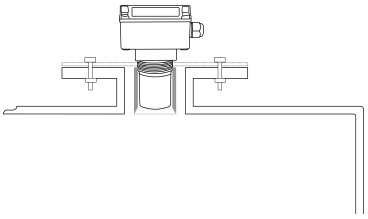
3.Along raise place of the container(pool) stomata to install.

4.Take the sensor in the circle tube to install.

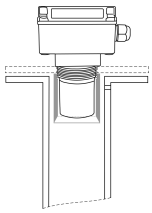
△If it is the airtight container , the flange on the container should accord with the following demand :

Mode	Demand
Measuring Range 4m 6m 8m	Minimum 65mm inner diameter of the flange. Insure the inboard wall of nozzle smooth. And a **Cannula** must be used outside of the sensor at the same time.
Measuring Range 8m(A) 10m	Minimum 80mm inner diameter of the flange, nozzle length should less than 150mm, insure the inboard wall of nozzle smooth, under along a smooth arc.
Measuring Range 15m、 20m 30m	Minimum 200mm inner diameter of the flange, flange nozzle length should less than 200mm.Measuring Range 15m:Minimum 150mm inner diameter of the flange . flange nozzle length should less than 150mm.

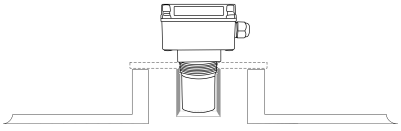
Narrate: When the sensor of measuring range 4m、6m、8m,their side face closer comparatively to other object .this object come into surrounding more to sensor ,or the area is too big to the face of sensor ,the instrument maybe become fake signal,So that the instrument can’t natural work. with above-mentioned instance must install cannula on the sensor. showing as follows:



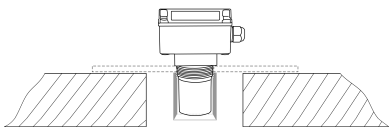
At theplace of container flange to install.



Take the sensor in the circle tube to install.



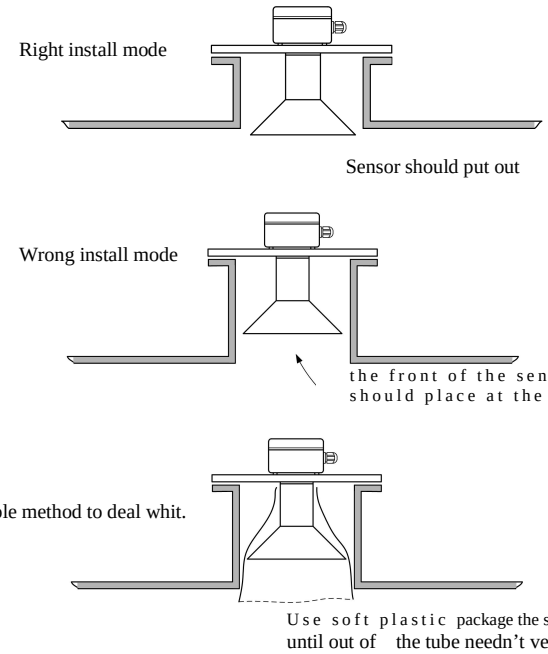
Along raise place of the container (pool).



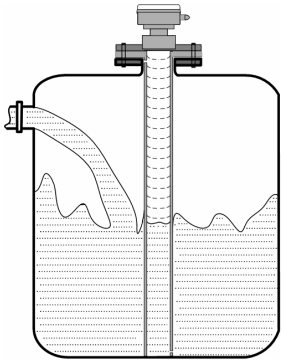
Install at the thicker floor slab hatch

Measuring range 4m、6m、8m level meter where need install cannula

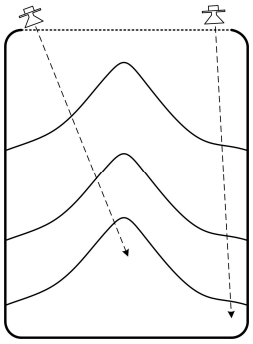
△Measuring range15m、20m、30m level meter :when they are install at the flange on the container、at the thicker floor slab hatch 、Along raise place of the container(pool) stomata , demand the highness or the thickness should less than the length of the sensor.Showing as follows :


Right install mode
Sensor should put out
Wrong install mode
the front of the sensor
should place at the tube
Simple method to deal whit.
Use soft plastic package the sensor outside
until out of the tube needn't very order.

Standard disposal method: 1. shorten the nozzle
2. Lengthen the sensor



Join the plastic tube to level off measuring

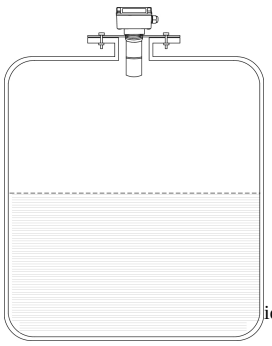


install position and angle, when measure material location

△ **If exist that the liquid fluctuate great , or having floaters 、 having objects that stops the sound wave etc., can insert a plastic tube to the container,** make the sound wave spread in the plastic tube only, it is reliable to guarantee measurement steadily. demand the inner diameter of the plastic tube bigger than the outer diameter of the sensor. inboard wall must be smooth、equal straight and **no seam**, The plastic tube should be straight, one hole should be open in top and bottom, so as to ensure that it is the same to be in charge of the internal and external level Simultaneity, for Measuring range 4m、6m、8m level meter, a **Cannula** must be used outside of the sensor.

△ **Launch surface of the level meter sensor should point to the liquid surface or the material surface vertically, should aim at goal as much as possible when installing**

△ When install to the cold area, Should choose the lengthen sensor of the level meter. make the sensor ext -end into the container, shun frost and icing



icing.how length need to lengthen, can confirm when subscribe for.

△ **Should guarantee the level not to enter the blanking distance at**

It can increase installation height if need. When increase installation height, require that the inner wall of nozzle should be smooth, its inner diameter should smaller than container flange's inner diameter.

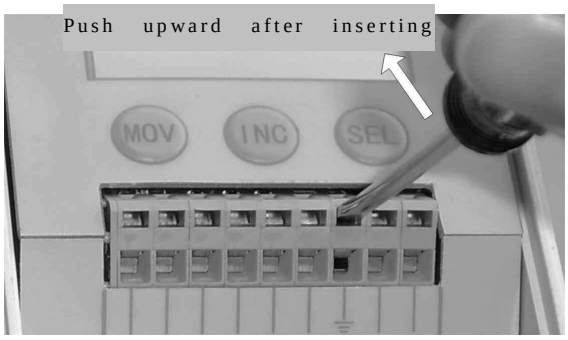
△ When the flange type installed, it should be **a plastic material** flange compounded for the sensor.

Wiring:

Need to take off the hiding line board at the time of wiring, and emerges the whole terminal block. Wiring use “one " word screwdriver as following picture..

Work After Electrifying:

Instrument show “HLUC” at first after electrify, show level value after a few seconds, indicator lamp glitter once every second at the same time.



What the instrument actual measured is the distance from sensor to the liquid or the material, later converted out the liquid location or material location value, it is very important to grasp this principle.

Press SEL key can look over measure distance value and temperature value.

Press MOV and SEL keys at the same time can enter parameter setting up state, after setting up installing height and measuring range, established upper limit and lower limit according to the need, then pressed SEL key

once again. Then press MOV and SEL keys at the same time and return to measure state. The instrument will show correct level value, will output the correct current signal , the switch signal in the upper limit and lower limit.

If measurement is wrong, please refer to the next section that "Trouble Deal With ".

Instrument Airproof

To keep it beautiful, we should make the cable in order and the hide

line board covered, after finish the state of the parameter setting up.because the cover is plastic material, so should make that four bolts keeping balance and strict. be assure the cover transm

Screw down the enter line prevent water tie-in. You’d better take the insulating tape bundle prevent water tie-in. You’d better make the outside cable deflexibility. prevent rain water inleakage. Especially,there are more cables entering, by all means, deal whit it as above.

If the application place have causticity gas ,you’d better use plasticene to the cable’s entrance, insure causticity gas can’t enter instrument bosom.

DEALLING WITH TROUBLES

Trouble Phenomenon	Trouble Reason	Solution
The instrument does not show, and does not work	It is wrong to supply power Wiring mistake	Check DC24v supplies power is right or not Check wiring is right or not
The instrument showing, not working	Sensor has not aimed at the liquid or the material Fluctuating range is very great the liquid Do not level extremely the material There are thicker foams the liquid The container bottom is not the level after the supplies are emptied. Exceeding the Measuring Range	Adjust the sensor and aim at the liquid or the materialJoin a plastic tube to the container Use level meter of the greater measuring range Use level meter of the greater measuring range Resume working naturally after adding the liquid or the material Use level meter of the greater measuring range
The instrument shows the unstablely or there are great deviations in measurement value.	The level enters the blanking distance Model 4m 6m level meter instlled on flange There are strong electromagnetisms interfered There are objects which stops the ultrasonic wave Have compounded the metal flange ring to sensor Touching with the metal on the sensor's launch surface or side face	Increase the installation height or prevent the level too high a **Cannula** must be used outside of the sensor Connect the earth or add the shielding for the level meter Change the installation site or join a plastic tube Use the plastic flange ring instead Use the rubber cushion to isolate from metal
The measure value has a small deviation all the time	the Installation height setting up has deviation There is a deviation all the time in distance measurement	Set up again The velocity of sound of gas changes, contact with producer.

MODEL SELECTION